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The *Biophysical Society Newsletter*

(ISSN 0006-3495) is published

twelve times per year, January-

December, by the Biophysical

Society, 11400 Rockville Pike, Suite

800, Rockville, Maryland 20852.

Distributed to USA members

and other countries at no cost.

Canadian GST No. 898477062.

Postmaster: Send address changes

to Biophysical Society, 11400

Rockville Pike, Suite 800, Rockville,

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Biophysicist in Profile

CHRIS YENGO

Chris Yengo's path to biophysics might be less traditional than some, starting in exercise science as an undergraduate and eventually leading into molecular physiology and biophysics. No doubt influenced by his parents, both teachers, and his early acclimation to the world of athletics through his football coaching father, Yengo closely associates science and sports, "since the competition motivates you to perform at your best and find ways to improve."

While working on his master's degree in exercise physiology at the University of Wyoming, Yengo had his first research experience. "Working with *Paul Thomas*, we studied the combined impact of myocardial infarction and exercise in a rodent model," he explained. The results led to an abstract that was selected for a platform presentation at a national meeting, and after attending and presenting, Yengo was hooked on pursuing a career in biomedical research. He headed to the University of Vermont to work on his PhD in physiology and biophysics.

"Science has many parallels to athletics, since the competition motivates you to perform at your best and always find ways to improve."

— Chris Yengo

PhD studies immersed Yengo in a highly collaborative environment focused on molecular motors and cell motility research. Working with *Chris Berger* as Berger established his lab, Yengo developed skills in molecular biology, protein expression/purification, and fluorescence spectroscopy. "It was a very exciting experience," Yengo said, "because there were many labs working on studies related to muscle contraction, molecular motors, and cytoskeleton." Working in Berger's

lab helped spark his interest in the structural properties of motors and his fascination with how they convert chemical energy into mechanical work.

His background in physiology led him to a postdoc position with *Lee Sweeney* at the University of Pennsylvania's Pennsylvania Muscle Institute, where he studied the structure and function of non-muscle myosins. "Lee was an outstanding mentor and provided many opportunities for me to develop new skills," said Yengo. "I was also particularly fortunate to work with other talented postdocs and mentors, including *Enrique De La Cruz* and *Carl Morris* (the former) and *Mike Ostap* and *Yale Goldman* (the latter)."

Currently, Yengo is an associate professor of cellular and molecular physiology at Penn State College of Medicine, in Hershey, Pennsylvania, where he also serves as the co-director of an integrated basic science course for first year medical students. His interest in class III myosins in sensory cells, developed during his time in the Sweeney lab, led to the two main themes of his independent lab's current research. "First, we are examining the conserved mechanism of force generation used by myosin motors," Yengo explained. To do this, his lab is site-specifically labeling myosin V with fluorescence probes at locations that allow examination of key conformation changes in the motor ATPase cycle. The second theme is

to characterize myosin motors that function in non-muscle cells using biochemical, biophysical, and cell biological approaches. “We are currently investigating class III myosins, involved in hearing and vision,” Yengo said. “Long term, I would like to determine the role of class III myosins in sensory cells and design therapies to prevent retinal degeneration and hearing loss.”

During his graduate student days, Berger introduced Yengo to *David Thomas*, Berger’s former mentor. “Chris introduced me to Chris,” joked Thomas. Yengo and Thomas have great respect for one another, with Yengo admiring Thomas for his “incredibly productive research that has contributed tremendously to biophysics in technology development and novel research findings.” Yengo considers himself fortunate to be collaborating with Thomas’ postdoc, *Joe Muretta*, in a study involving transient structural kinetics of myosin V. “Chris is a fearless scientist who tackles difficult problems, such as expressing mutants of brain myosin in insect cells, attaching multiple fluorescent probes, then detecting transient structural changes during enzyme action,” said Thomas. “Not many people would think to try this sort of thing.”

Over his academic career, Yengo has faced the challenges of balancing research time with teaching and other responsibilities. Starting his independent career at the University of North Carolina, Charlotte, he joined a team of scientists who were developing an interdisciplinary PhD program in biology, including biology, chemistry, physics, and bioengineering. “They wanted to hire a biophysicist who could work with other disciplines to build the program,” Yengo explained. “It was rewarding to develop a biophysics course for both graduate and undergraduate experiences.”

Yengo considers mentoring students at all levels an important part of his career. For the past three years, he has participated in the American Heart Association’s Summer Undergraduate Research Fellowship (SURF) program at Penn State, a course where undergraduate students work in the lab for 12 weeks over the summer, while being mentored by Penn State faculty. “Each student I mentored accomplished a great deal and went on to attend the Biophysical Society Annual

Meeting the following year,” Yengo said. “It is rewarding to see a student get excited by their progress in research, and then attend the meeting to get a perspective on the tremendous developments in biophysics research.”

Another rewarding aspect of Yengo’s career is the opportunity to collaborate with other researchers in the field. “Colleagues in biophysics are very generous about sharing ideas and working together to address problems,” Yengo reflected. He has benefited from much collaboration, including working with *Bechara Kachar*, NIH; *Jim Sellers*, NIH; and *Don Jacobs*, UNC Charlotte. “Many researchers from different backgrounds have converged on biophysical questions,” said Yengo. “It is refreshing to discuss your research areas with colleagues from completely different backgrounds.”

Yengo’s appreciation of collaboration motivated him to organize a Biophysical Society Local Networking Event at his university in November 2011. With the help of *William Hancock*, Penn State, *Dimitrios Vavylonis*, Lehigh University, and *Ekaterina L. Grishchuk*, University of Pennsylvania, the event continued in 2012 (at Lehigh University) and will take place again in September 2013 at Penn State.

In addition to organizing the local event, Yengo served as co-chair with *Mihály Kovács* for the Motility Subgroup symposium at the 2013 Biophysical Society Annual Meeting. “The Biophysical Society is a great organization that fosters the development of biophysical research and provides outstanding opportunities for researchers/educators to present their work, network, and collaborate,” said Yengo.

Outside of the lab, Yengo enjoys spending time with his 13-year-old son Jack, wife Amy, and dog Charlotte, as well as cycling to work, golfing, fishing, and completing triathlons and other races. If not for biophysics, his enthusiasm for fitness and background as a wrestler might have led him to an alternate career path as a high school science teacher and coach. “I thoroughly enjoy visiting my son’s classroom each year,” Yengo said. “The students get a chance to experience things like liquid nitrogen and discuss material properties and the states of matter.”



Yengo with his wife Amy, son Jack, and dog Charlotte.